

Exhibit 300: Capital Asset Plan and Business Case Summary**Part I: Summary Information And Justification (All Capital Assets)****Section A: Overview (All Capital Assets)**

1. Date of Submission: 4/10/2009
2. Agency: Department of Energy
3. Bureau: National Nuclear Security Administration
4. Name of this Capital Asset: NNSA ASC SNL Red Storm Platform
5. Unique Project (Investment) Identifier: (For IT investment only, see section 53. For all other, use agency ID system.) 019-05-01-11-01-2052-00
6. What kind of investment will this be in FY 2010? (Please NOTE: Investments moving to O&M in FY 2010, with Planning/Acquisition activities prior to FY 2010 should not select O&M. These investments should indicate their current status.) Operations and Maintenance
7. What was the first budget year this investment was submitted to OMB? FY2001 or earlier
8. Provide a brief summary and justification for this investment, including a brief description of how this closes in part or in whole an identified agency performance gap:
The National Nuclear Security Administration (NNSA) Advanced Simulation and Computing Program (ASC) Red Storm continues to perform its peak speed in a computing terrain in which a single teraflop was a big deal only a few years ago. In 2006, ASC Red Storm was rated the second fastest supercomputer in the world. The widely recognized Linpack test measures a supercomputer's speed as applied to a computing problem. In peak speed, Red Storm remains well behind BlueGene/L at Lawrence Livermore National Laboratory, but, "in terms of scalability, Red Storm is the best in the world. Red Storm is Sandia's largest high-performance computer and is thrifty in its use of power.
9. Did the Agency's Executive/Investment Committee approve this request? Yes
 - a. If "yes," what was the date of this approval? 8/21/2008
10. Did the Project Manager review this Exhibit? Yes
11. Contact information of Program/Project Manager?

Name Brinker, Samuel D/Lee, Sander

Phone Number 925-422-0710 202-586-2698

Email samuel.brinker@oak.doe.gov/ sander.lee@nnsa.doe.gov
- a. What is the current FAC-P/PM (for civilian agencies) or DAWIA (for defense agencies) certification level of the program/project manager? Waiver Issued
- b. When was the Program/Project Manager Assigned? 8/8/2008
- c. What date did the Program/Project Manager receive the FAC-P/PM certification? If the certification has not been issued, what is the anticipated date for certification? 2/25/2009
12. Has the agency developed and/or promoted cost effective, energy-efficient and environmentally sustainable techniques or practices for this project? Yes
 - a. Will this investment include electronic assets (including computers)? Yes
 - b. Is this investment for new construction or major retrofit of a Federal building or facility? (answer applicable to non-IT assets only) No
 1. If "yes," is an ESPC or UESC being used to help fund this investment?
 2. If "yes," will this investment meet sustainable design principles?
 3. If "yes," is it designed to be 30% more energy

efficient than relevant code?

13. Does this investment directly support one of the PMA initiatives? Yes

If "yes," check all that apply:

Expanded E-Government

a. Briefly and specifically describe for each selected how this asset directly supports the identified initiative(s)? (e.g. If E-Gov is selected, is it an approved shared service provider or the managing partner?)

The ASC program supports the Presidential Expanded E-Government initiative through Mission Area Support by enabling collaborations between the three DOE/NNSA nuclear weapons Laboratories - Los Alamos, Lawrence Livermore, and Sandia National Laboratories (LANL, LLNL, and SNL) through shared research & development "high performance computing" simulations platforms in order to meet DOE mission Goal 2.1 deliverables.

14. Does this investment support a program assessed using the Program Assessment Rating Tool (PART)? (For more information about the PART, visit www.whitehouse.gov/omb/part.) Yes

a. If "yes," does this investment address a weakness found during a PART review? No

b. If "yes," what is the name of the PARTed program? 10000076 - National Nuclear Security Administration: Advanced Simulation and Computing (ASC)

c. If "yes," what rating did the PART receive? Effective

15. Is this investment for information technology? Yes

If the answer to Question 15 is "Yes," complete questions 16-23 below. If the answer is "No," do not answer questions 16-23.

For information technology investments only:

16. What is the level of the IT Project? (per CIO Council PM Guidance) Level 3

17. In addition to the answer in 11(a), what project management qualifications does the Project Manager have? (per CIO Council PM Guidance) (1) Project manager has been validated as qualified for this investment

18. Is this investment or any project(s) within this investment identified as "high risk" on the Q4 - FY 2008 agency high risk report (per OMB Memorandum M-05-23)? No

19. Is this a financial management system? No

a. If "yes," does this investment address a FFMIA compliance area?

1. If "yes," which compliance area:

2. If "no," what does it address?

b. If "yes," please identify the system name(s) and system acronym(s) as reported in the most recent financial systems inventory update required by Circular A-11 section 52

20. What is the percentage breakout for the total FY2010 funding request for the following? (This should total 100%)

Hardware	0
Software	0
Services	100
Other	0

21. If this project produces information dissemination products for the public, are these products published to the Internet in conformance with OMB Memorandum 05-04 and included in your agency inventory, schedules and priorities? N/A

22. Contact information of individual responsible for privacy related questions:

Name	Hagerty, Kevin T
Phone Number	202-586-5955
Title	Freedom of Information & Privacy Acts Officer
E-mail	kevin.hagerty@hq.doe.gov

23. Are the records produced by this investment No

appropriately scheduled with the National Archives and Records Administration's approval?

Question 24 must be answered by all Investments:

24. Does this investment directly support one of the GAO High Risk Areas? No

Section B: Summary of Spending (All Capital Assets)

1. Provide the total estimated life-cycle cost for this investment by completing the following table. All amounts represent budget authority in millions, and are rounded to three decimal places. Federal personnel costs should be included only in the row designated "Government FTE Cost," and should be excluded from the amounts shown for "Planning," "Full Acquisition," and "Operation/Maintenance." The "TOTAL" estimated annual cost of the investment is the sum of costs for "Planning," "Full Acquisition," and "Operation/Maintenance." For Federal buildings and facilities, life-cycle costs should include long term energy, environmental, decommissioning, and/or restoration costs. The costs associated with the entire life-cycle of the investment should be included in this report.

Table 1: SUMMARY OF SPENDING FOR PROJECT PHASES (REPORTED IN MILLIONS)									
(Estimates for BY+1 and beyond are for planning purposes only and do not represent budget decisions)									
	PY-1 and earlier	PY 2008	CY 2009	BY 2010	BY+1 2011	BY+2 2012	BY+3 2013	BY+4 and beyond	Total
Planning:	0	0	0	0	0	0	0	0	0
Acquisition:	76.035	12.85	0	0	0	0	0	0	88.885
Subtotal Planning & Acquisition:	76.035	12.85	0	0	0	0	0	0	88.885
Operations & Maintenance:	4.324	2.5	2.5	2.5	0	0	0	0	11.824
TOTAL:	80.359	15.35	2.5	2.5	0	0	0	0	100.709
Government FTE Costs should not be included in the amounts provided above.									
Government FTE Costs	0.12	0.04	0.04	0.05	0	0	0	0	0.25
Number of FTE represented by Costs:	1	1	1	1	0	0	0	0	4

Note: For the multi-agency investments, this table should include all funding (both managing partner and partner agencies). Government FTE Costs should not be included as part of the TOTAL represented.

2. Will this project require the agency to hire additional FTE's? No

a. If "yes," How many and in what year?

3. If the summary of spending has changed from the FY2009 President's budget request, briefly explain those changes: Government FTE budget increases due to annual inflation.

Section C: Acquisition/Contract Strategy (All Capital Assets)

1. Complete the table for all (including all non-Federal) contracts and/or task orders currently in place or planned for this investment. Total Value should include all option years for each contract. Contracts and/or task orders completed do not need to be included.

Exhibit 300: NNSA ASC SNL Red Storm Platform (Revision 14)

Contracts/Task Orders Table:															* Costs in millions	
Contract or Task Order Number	Type of Contract/ Task Order (In accordance with FAR Part 16)	Has the contract been awarded (Y/N)	If so what is the date of the award? If not, what is the planned award date?	Start date of Contract/ Task Order	End date of Contract/ Task Order	Total Value of Contract/ Task Order (\$M)	Is this an Interagency Acquisition ? (Y/N)	Is it performance based? (Y/N)	Competitively awarded? (Y/N)	What, if any, alternative financing option is being used? (ESPC, UESC, EUL, N/A)	Is EVM in the contract? (Y/N)	Does the contract include the required security & privacy clauses? (Y/N)	Name of CO	CO Contact information (phone/email)	Contracting Officer FAC-C or DAWIA Certification Level (Level 1, 2, 3, N/A)	If N/A, has the agency determined the CO assigned has the competencies and skills necessary to support this acquisition ? (Y/N)
32124	Firm Fixed Price M&O SubContract with Milestone Payments tied to specific deliverables and schedule dates.	Yes	9/23/2002	9/23/2002	5/15/2010	100.709414	No	Yes	Yes	NA	No	Yes	Wagner, Patty	505-845-6036 / patty.wagner@snl.gov	N/A	Yes

2. If earned value is not required or will not be a contract requirement for any of the contracts or task orders above, explain why:

EVM is not required on steady state investments, but completion of operational analysis is required on steady state investments. The Sandia National Laboratories M&O Contracting Officer on Red Storm is Patricia Brown (phone: 505-284-0191; email: pgbrown@sandia.gov).

3. Do the contracts ensure Section 508 compliance?

Yes

a. Explain why not or how this is being done?

ASC Red Storm is Section 508 compliant. This is a centralized computer system housed in a large computing facility. The entire building that will house the platform is ANSI A117.1.1998 compliant on which Section 508 is based. Users access the system via network connections. Accessibility issues of those users are the responsibility of their IT Department.

4. Is there an acquisition plan which reflects the requirements of FAR Subpart 7.1 and has been approved in accordance with agency requirements?

Yes

a. If "yes," what is the date?

5/1/2001

1. Is it Current?

Yes

b. If "no," will an acquisition plan be developed?

1. If "no," briefly explain why:

Section D: Performance Information (All Capital Assets)

In order to successfully address this area of the exhibit 300, performance goals must be provided for the agency and be linked to the annual performance plan. The investment must discuss the agency's mission and strategic goals, and performance measures (indicators) must be provided. These goals need to map to the gap in the agency's strategic goals and objectives this investment is designed to fill. They are the internal and external performance benefits this investment is expected to deliver to the agency (e.g., improve efficiency by 60 percent, increase citizen participation by 300 percent a year to achieve an overall citizen participation rate of 75 percent by FY 2xxx, etc.). The goals must be clearly measurable investment outcomes, and if applicable, investment outputs. They do not include the completion date of the module, milestones, or investment, or general goals, such as, significant, better, improved that do not have a quantitative or qualitative measure.

Agencies must use the following table to report performance goals and measures for the major investment and use the Federal Enterprise Architecture (FEA) Performance Reference Model (PRM). Map all Measurement Indicators to the corresponding "Measurement Area" and "Measurement Grouping" identified in the PRM. There should be at least one Measurement Indicator for each of the four different Measurement Areas (for each fiscal year). The PRM is available at www.egov.gov. The table can be extended to include performance measures for years beyond the next President's Budget.

Performance Information Table								
Fiscal Year	Strategic Goal(s) Supported	Measurement Area	Measurement Category	Measurement Grouping	Measurement Indicator	Baseline	Target	Actual Results
2008	GOAL 2.1 Nuclear Deterrent Transform the Nation's nuclear deterrent and supporting infrastructure to be more responsive to the threats of the 21st Century.	Customer Results	Timeliness and Responsiveness	Delivery Time	Sustained calculation speed measured in calculations per second relative to peak system flop based on measurement reported by the application CTH.	12%	15%	12% through Q4 FY08.
2008	GOAL 2.1 Nuclear Deterrent Transform the Nation's nuclear deterrent and supporting infrastructure to be more responsive to the threats of the 21st Century.	Mission and Business Results	Defense and National Security	Operational Defense	Annual # of jobs run.	150,000	165,000	Exceeded target at 269,519 through Q4 FY08.
2008	GOAL 2.1 Nuclear Deterrent Transform the Nation's nuclear deterrent and supporting infrastructure to	Processes and Activities	Productivity	Efficiency	Percent CPU Utilization: Measures the time period (cycles) that a CPU actually performs its intended	80%	85%	Met target at 85% through Q4 FY08.

Performance Information Table								
Fiscal Year	Strategic Goal(s) Supported	Measurement Area	Measurement Category	Measurement Grouping	Measurement Indicator	Baseline	Target	Actual Results
	be more responsive to the threats of the 21st Century.				function to enable response to stockpile issues.			
2008	GOAL 2.1 Nuclear Deterrent Transform the Nation's nuclear deterrent and supporting infrastructure to be more responsive to the threats of the 21st Century.	Technology	Reliability and Availability	Availability	Percent Time Available: Measures platform uptime for simulation codes needed to perform predictive capability.	88%	93%	Met target at 93% through Q4 FY08.
2009	GOAL 2.1 Nuclear Deterrent Transform the Nation's nuclear deterrent and supporting infrastructure to be more responsive to the threats of the 21st Century.	Customer Results	Timeliness and Responsiveness	Delivery Time				
2009	GOAL 2.1 Nuclear Deterrent Transform the Nation's nuclear deterrent and supporting infrastructure to be more responsive to the threats of the 21st Century.	Mission and Business Results	Defense and National Security	Operational Defense				
2009	GOAL 2.1 Nuclear Deterrent Transform the Nation's nuclear deterrent and supporting infrastructure to be more responsive to the threats of the 21st Century.	Processes and Activities	Productivity	Efficiency				
2009	GOAL 2.1 Nuclear Deterrent Transform the Nation's nuclear deterrent and supporting infrastructure to be more responsive to the threats of the 21st Century.	Technology	Reliability and Availability	Availability				
2010	GOAL 2.1 Nuclear Deterrent Transform the Nation's nuclear deterrent and supporting infrastructure to be more responsive to the threats of the 21st Century.	Customer Results	Timeliness and Responsiveness	Delivery Time				
2010	GOAL 2.1 Nuclear	Mission and Business Results	Defense and National Security	Operational Defense				

Performance Information Table								
Fiscal Year	Strategic Goal(s) Supported	Measurement Area	Measurement Category	Measurement Grouping	Measurement Indicator	Baseline	Target	Actual Results
	Deterrent Transform the Nation's nuclear deterrent and supporting infrastructure to be more responsive to the threats of the 21st Century.							
2010	GOAL 2.1 Nuclear Deterrent Transform the Nation's nuclear deterrent and supporting infrastructure to be more responsive to the threats of the 21st Century.	Processes and Activities	Productivity	Efficiency				
2010	GOAL 2.1 Nuclear Deterrent Transform the Nation's nuclear deterrent and supporting infrastructure to be more responsive to the threats of the 21st Century.	Technology	Reliability and Availability	Availability				

Section E: Security and Privacy (IT Capital Assets only)

In order to successfully address this area of the business case, each question below must be answered at the system/application level, not at a program or agency level. Systems supporting this investment on the planning and operational systems security tables should match the systems on the privacy table below. Systems on the Operational Security Table must be included on your agency FISMA system inventory and should be easily referenced in the inventory (i.e., should use the same name or identifier).

For existing Mixed-Life Cycle investments where enhancement, development, and/or modernization is planned, include the investment in both the "Systems in Planning" table (Table 3) and the "Operational Systems" table (Table 4). Systems which are already operational, but have enhancement, development, and/or modernization activity, should be included in both Table 3 and Table 4. Table 3 should reflect the planned date for the system changes to be complete and operational, and the planned date for the associated C&A update. Table 4 should reflect the current status of the requirements listed. In this context, information contained within Table 3 should characterize what updates to testing and documentation will occur before implementing the enhancements; and Table 4 should characterize the current state of the materials associated with the existing system.

All systems listed in the two security tables should be identified in the privacy table. The list of systems in the "Name of System" column of the privacy table (Table 8) should match the systems listed in columns titled "Name of System" in the security tables (Tables 3 and 4). For the Privacy table, it is possible that there may not be a one-to-one ratio between the list of systems and the related privacy documents. For example, one PIA could cover multiple systems. If this is the case, a working link to the PIA may be listed in column (d) of the privacy table more than once (for each system covered by the PIA).

The questions asking whether there is a PIA which covers the system and whether a SORN is required for the system are discrete from the narrative fields. The narrative column provides an opportunity for free text explanation why a working link is not provided. For example, a SORN may be required for the system, but the system is not yet operational. In this circumstance, answer "yes" for column (e) and in the narrative in column (f), explain that because the system is not operational the SORN is not yet required to be published.

Please respond to the questions below and verify the system owner took the following actions:

1. Have the IT security costs for the system(s) been identified and integrated into the overall costs of the investment?:

a. If "yes," provide the "Percentage IT Security" for the budget year:

2. Is identifying and assessing security and privacy risks a part of the overall risk management effort for each system supporting or part of this investment?

3. Systems in Planning and Undergoing Enhancement(s), Development, and/or Modernization - Security Table(s):			
Name of System	Agency/ or Contractor Operated System?	Planned Operational Date	Date of Planned C&A update (for existing mixed life cycle systems) or Planned Completion Date (for new systems)

4. Operational Systems - Security Table:							
Name of System	Agency/ or Contractor Operated System?	NIST FIPS 199 Risk Impact level (High, Moderate, Low)	Has C&A been Completed, using NIST 800-37? (Y/N)	Date Completed: C&A	What standards were used for the Security Controls tests? (FIPS 200/NIST 800-53, Other, N/A)	Date Completed: Security Control Testing	Date the contingency plan tested
ASC SNL Red Storm							

5. Have any weaknesses, not yet remediated, related to any of the systems part of or supporting this investment been identified by the agency or IG?

a. If "yes," have those weaknesses been incorporated into the agency's plan of action and milestone process?

6. Indicate whether an increase in IT security funding is requested to remediate IT security weaknesses?

a. If "yes," specify the amount, provide a general description of the weakness, and explain how the funding request will remediate the weakness.

7. How are contractor security procedures monitored, verified, and validated by the agency for the contractor systems above? Contractor security procedures are monitored, verified and validated by a comprehensive set of controls.

8. Planning & Operational Systems - Privacy Table:					
(a) Name of System	(b) Is this a new system? (Y/N)	(c) Is there at least one Privacy Impact Assessment (PIA) which covers this system? (Y/N)	(d) Internet Link or Explanation	(e) Is a System of Records Notice (SORN) required for this system? (Y/N)	(f) Internet Link or Explanation
ASC SNL Red Storm	No	No	No, because the system does not contain, process, or transmit personal identifying information.	No	No, because the system is not a Privacy Act system of records.

Details for Text Options:

Column (d): If yes to (c), provide the link(s) to the publicly posted PIA(s) with which this system is associated. If no to (c), provide an explanation why the PIA has not been publicly posted or why the PIA has not been conducted.

Column (f): If yes to (e), provide the link(s) to where the current and up to date SORN(s) is published in the federal register. If no to (e), provide an explanation why the SORN has not been published or why there isn't a current and up to date SORN.

Note: Working links must be provided to specific documents not general privacy websites. Non-working links will be considered as a blank field.

Section F: Enterprise Architecture (EA) (IT Capital Assets only)

In order to successfully address this area of the capital asset plan and business case, the investment must be included in the agency's EA and Capital Planning and Investment Control (CPIC) process and mapped to and supporting the FEA. The business case must demonstrate the relationship between the investment and the business, performance, data, services, application, and technology layers of the agency's EA.

1. Is this investment included in your agency's target enterprise architecture? Yes

a. If "no," please explain why?

2. Is this investment included in the agency's EA Transition Strategy? Yes

a. If "yes," provide the investment name as identified in the Transition Strategy provided in the agency's most recent annual EA Assessment. NNSA ASC SNL Red Storm Platform (ASC-SNL-RSP)

b. If "no," please explain why?

3. Is this investment identified in a completed and approved segment architecture? No

a. If "yes," provide the six digit code corresponding to the agency segment architecture. The segment architecture codes are maintained by the agency Chief Architect. For detailed guidance regarding segment architecture codes, please refer to <http://www.egov.gov>. 110-000

4. Service Component Reference Model (SRM) Table:

Identify the service components funded by this major IT investment (e.g., knowledge management, content management, customer relationship management, etc.). Provide this information in the format of the following table. For detailed guidance regarding components, please refer to <http://www.egov.gov>.

Agency Component Name	Agency Component Description	FEA SRM Service Domain	FEA SRM Service Type	FEA SRM Component (a)	Service Component Reused Name (b)	Service Component Reused UPI (b)	Internal or External Reuse? (c)	BY Funding Percentage (d)
Modeling	Develop descriptions to adequately explain relevant data for the purpose of prediction, pattern detection, exploration or general organization of data	Business Analytical Services	Knowledge Discovery	Modeling			No Reuse	20
Simulation	Utilize models to mimic real-world processes	Business Analytical Services	Knowledge Discovery	Simulation			No Reuse	80

a. Use existing SRM Components or identify as "NEW". A "NEW" component is one not already identified as a service component in the FEA SRM.

b. A reused component is one being funded by another investment, but being used by this investment. Rather than answer yes or no, identify the reused service component funded by the other investment and identify the other investment using the Unique Project Identifier (UPI) code from the OMB Ex 300 or Ex 53 submission.

c. 'Internal' reuse is within an agency. For example, one agency within a department is reusing a service component provided by another agency within the same department. 'External' reuse is one agency within a department reusing a service component provided by another agency in another department. A good example of this is an E-Gov initiative service being reused by multiple organizations across the federal government.

d. Please provide the percentage of the BY requested funding amount used for each service component listed in the table. If external, provide the percentage of the BY requested funding amount transferred to another agency to pay for the service. The percentages in the column can, but are not required to, add up to 100%.

5. Technical Reference Model (TRM) Table:

To demonstrate how this major IT investment aligns with the FEA Technical Reference Model (TRM), please list the Service Areas, Categories, Standards, and Service Specifications supporting this IT investment.

FEA SRM Component (a)	FEA TRM Service Area	FEA TRM Service Category	FEA TRM Service Standard	Service Specification (b) (i.e., vendor and product name)
Modeling	Component Framework	Data Management	Reporting and Analysis	
Simulation	Component Framework	Data Management	Reporting and Analysis	
Modeling	Service Platform and Infrastructure	Hardware / Infrastructure	Servers / Computers	
Simulation	Service Platform and Infrastructure	Hardware / Infrastructure	Servers / Computers	
Modeling	Service Platform and Infrastructure	Software Engineering	Modeling	

a. Service Components identified in the previous question should be entered in this column. Please enter multiple rows for FEA SRM Components supported by multiple TRM Service Specifications

b. In the Service Specification field, agencies should provide information on the specified technical standard or vendor product mapped to the FEA TRM Service Standard, including model or version numbers, as appropriate.

6. Will the application leverage existing components and/or applications across the Government (i.e., USA.gov, Pay.Gov, etc)? No

a. If "yes," please describe.

Exhibit 300: Part III: For "Operation and Maintenance" investments ONLY (Steady State)**Section A: Risk Management (All Capital Assets)**

Part III should be completed only for investments identified as "Operation and Maintenance" (Steady State) in response to Question 6 in Part I, Section A above.

You should have performed a risk assessment during the early planning and initial concept phase of this investment's life-cycle, developed a risk-adjusted life-cycle cost estimate and a plan to eliminate, mitigate or manage risk, and be actively managing risk throughout the investment's life-cycle.

1. Does the investment have a Risk Management Plan? Yes
 - a. If "yes," what is the date of the plan? 10/1/2007
 - b. Has the Risk Management Plan been significantly changed since last year's submission to OMB? No
 - c. If "yes," describe any significant changes:

2. If there currently is no plan, will a plan be developed?
 - a. If "yes," what is the planned completion date?
 - b. If "no," what is the strategy for managing the risks?

Section B: Cost and Schedule Performance (All Capital Assets)

1. Was an operational analysis conducted? Yes
 - a. If "yes," provide the date the analysis was completed. 6/13/2008
 - b. If "yes," what were the results?

The NNSA Advanced Simulation and Computing (ASC) Program hereby certifies that the NNSA ASC SNL Red Storm Platform system utilization met its target, and the investment is funded 100% for steady state operation, and it is achieving at least 90% of its cost, schedule, and performance baseline goals as documented in the Exhibit 300.

- c. If "no," please explain why it was not conducted and if there are any plans to conduct operational analysis in the future:

2. Complete the following table to compare actual cost performance against the planned cost performance baseline. Milestones reported may include specific individual scheduled preventative and predictable corrective maintenance activities, or may be the total of planned annual operation and maintenance efforts).

- a. What costs are included in the reported Cost/Schedule Performance information (Government Only/Contractor Only/Both)? Contractor and Government

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2.b Comparison of Plan vs. Actual Performance Table

Milestone Number	Description of Milestone	Planned		Actual		Variance	
		Completion Date (mm/dd/yyyy)	Total Cost(\$M)	Completion Date (mm/dd/yyyy)	Total Cost(\$M)	Schedule (# days)	Cost(\$M)
1	Material Purchase	9/25/2002	\$8.350000	9/22/2003	\$8.017444	-362	\$0.332556
2	Pre-pay for T&M OS Dev	9/25/2002	\$1.250000	9/30/2003	\$1.250000	-370	\$0.000000
3	System Chip (Seastar)	9/25/2002	\$0.170000	1/16/2003	\$0.170000	-113	\$0.000000
4	RAS design specs	9/30/2002	\$0.120000	9/19/2003	\$0.120000	-354	\$0.000000
5	Hardware specs per SOW	9/30/2002	\$0.220000	10/7/2002	\$0.220000	-7	\$0.000000
6	PVFS clie	9/30/2002	\$0.120000	9/30/2002	\$0.120000	0	\$0.000000
7	System chip FAB	9/30/2002	\$0.070000	9/30/2002	\$0.070000	0	\$0.000000
8	General progress checkpoint	9/30/2002	\$0.200000	9/30/2002	\$0.200000	0	\$0.000000
9	Floor plan netlist	10/15/2002	\$0.200000	2/19/2003	\$0.200000	-127	\$0.000000
10	Material Purchase	10/1/2002	\$3.950000	12/16/2003	\$3.217041	-441	\$0.732959
10	System boot design	10/15/2002	\$0.150000	7/25/2003	\$0.150000	-283	\$0.000000
11	Connector passes qualification	10/30/2002	\$0.150000	12/12/2002	\$0.150000	-43	\$0.000000
12	Service & I/O board module	10/30/2002	\$0.200000	12/20/2002	\$0.200000	-51	\$0.000000
13	General Progress Checkpoint	10/31/2002	\$0.200000	10/31/2002	\$0.200000	0	\$0.000000
14	RAS event logging	11/29/2002	\$0.170000	12/2/2002	\$0.170000	-3	\$0.000000
15	RAS diagnostics design	11/29/2002	\$0.170000	12/16/2003	\$0.170000	-382	\$0.000000
16	Reliability database demo	11/29/2002	\$0.170000	12/11/2002	\$0.170000	-12	\$0.000000
17	Total Catamount design	11/29/2002	\$0.190000	12/24/2002	\$0.190000	-25	\$0.000000
18	General progress checkpoint	11/29/2002	\$0.200000	11/29/2002	\$0.200000	0	\$0.000000
19	Preliminary Seastar transmit	12/16/2002	\$0.150000	1/6/2003	\$0.150000	-21	\$0.000000
20	Node resilient demo	12/31/2002	\$0.075000	12/31/2002	\$0.075000	0	\$0.000000
21	Complete PBS design	12/31/2002	\$0.075000	12/31/2002	\$0.075000	0	\$0.000000
22	Manufacturing, assembly & test DRAFT	12/31/2002	\$0.100000	12/31/2002	\$0.100000	0	\$0.000000
23	PVFS Client Demo	12/31/2002	\$0.150000	12/31/2002	\$0.150000	0	\$0.000000
24	RISK MIT-PVFS Demo	12/31/2002	\$0.150000	12/31/2002	\$0.150000	0	\$0.000000
25	General progress checkpoint	12/30/2002	\$0.200000	12/30/2002	\$0.200000	0	\$0.000000
26	Mechanical cabinet design	1/30/2003	\$0.125000	2/11/2003	\$0.125000	-12	\$0.000000
27	RAS GUI prototype demo	1/30/2003	\$0.100000	2/11/2003	\$0.100000	-12	\$0.000000
28	Preliminary Seastar Netlist	1/30/2003	\$0.200000	5/27/2003	\$0.200000	-117	\$0.000000
29	Starfish I/O board back from FAB	1/31/2003	\$0.275000	7/1/2003	\$0.275000	-151	\$0.000000
30	General progress checkpoint	1/31/2003	\$0.200000	1/31/2003	\$0.200000	0	\$0.000000

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2.b Comparison of Plan vs. Actual Performance Table

Milestone Number	Description of Milestone	Planned		Actual		Variance	
		Completion Date (mm/dd/yyyy)	Total Cost(\$M)	Completion Date (mm/dd/yyyy)	Total Cost(\$M)	Schedule (# days)	Cost(\$M)
31	Compute module board trial route	2/28/2003	\$0.150000	9/19/2003	\$0.150000	-203	\$0.000000
32	Final Seastar Netlist delivered	2/28/2003	\$0.250000	9/24/2003	\$0.250000	-208	\$0.000000
33	Demo 8 way strip PVFS	2/28/2003	\$0.200000	3/10/2003	\$0.200000	-10	\$0.000000
34	Demo MPI 1.2 + MPI I/O	2/28/2003	\$0.100000	6/12/2003	\$0.100000	-104	\$0.000000
35	General progress checkpoint	2/28/2003	\$0.200000	6/12/2003	\$0.200000	-104	\$0.000000
36	Key supplier qualification process	3/31/2003	\$0.100000	4/21/2003	\$0.100000	-21	\$0.000000
37	System accounting design	3/31/2003	\$0.100000	6/5/2004	\$0.100000	-432	\$0.000000
38	Starfish containing router & LCB testing	3/31/2003	\$0.100000	11/24/2003	\$0.100000	-238	\$0.000000
39	Prototype compute cabinet fabricated	3/31/2003	\$0.150000	9/22/2003	\$0.150000	-175	\$0.000000
40	Demonstrate portals driver on Linux	3/31/2003	\$0.150000	5/13/2003	\$0.150000	-43	\$0.000000
41	Catamount demo on development hardware	3/31/2003	\$0.100000	5/20/2003	\$0.100000	-50	\$0.000000
42	General progress checkpoint	3/31/2003	\$0.200000	3/31/2003	\$0.200000	0	\$0.000000
43	RAS diagnostic demo	4/30/2003	\$0.100000	9/16/2004	\$0.100000	-505	\$0.000000
44	RAS to initialize starfish support demo	4/30/2003	\$0.300000	9/19/2003	\$0.300000	-142	\$0.000000
45	Starfish compute Node to FAB	4/30/2003	\$0.300000	4/30/2003	\$0.300000	0	\$0.000000
46	General progress checkpoint	4/30/2003	\$0.200000	4/30/2003	\$0.200000	0	\$0.000000
47	TotalView NUB Demo	5/15/2003	\$0.150000	11/24/2003	\$0.150000	-193	\$0.000000
48	Performance tool able to monitor MPI	5/30/2003	\$0.225000	5/30/2003	\$0.225000	0	\$0.000000
49	Third party file system (Lustre) demo	5/30/2003	\$0.200000	6/12/2003	\$0.200000	-13	\$0.000000
50	Fault tolerant PBS demo	5/30/2003	\$0.125000	5/30/2003	\$0.125000	0	\$0.000000
51	General progress checkpoint	5/31/2003	\$0.200000	5/31/2003	\$0.200000	0	\$0.000000
52	Select gigE offload card	6/30/2003	\$0.100000	9/19/2003	\$0.100000	-81	\$0.000000
53	Linux boot on Starfish I/O module demo	6/30/2003	\$0.600000	9/19/2003	\$0.600000	-81	\$0.000000
54	General progress checkpoint	6/30/2003	\$0.200000	6/30/2003	\$0.200000	0	\$0.000000
55	Demonstrate ability to boot	7/31/2003	\$0.100000	10/21/2003	\$0.100000	-82	\$0.000000

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2.b Comparison of Plan vs. Actual Performance Table

Milestone Number	Description of Milestone	Planned		Actual		Variance	
		Completion Date (mm/dd/yyyy)	Total Cost(\$M)	Completion Date (mm/dd/yyyy)	Total Cost(\$M)	Schedule (# days)	Cost(\$M)
	Catamount thru RAS						
56	Full starfish boot (linux & Catamount)	7/31/2003	\$0.400000	1/19/2004	\$0.400000	-172	\$0.000000
57	Prototype Bill of Material (BOM) Review	7/31/2003	\$0.200000	8/28/2003	\$0.200000	-28	\$0.000000
58	General progress checkpoint	7/31/2003	\$0.200000	7/31/2003	\$0.200000	0	\$0.000000
59	Seastar physical design release	8/15/2003	\$0.400000	12/16/2003	\$0.400000	-123	\$0.000000
60	Logarithmic or constant time demo	8/29/2003	\$0.150000	8/29/2003	\$0.150000	0	\$0.000000
61	Manufacturing readiness review	8/29/2003	\$0.150000	9/19/2003	\$0.150000	-21	\$0.000000
62	General progress checkpoint	8/31/2003	\$0.200000	8/31/2003	\$0.200000	0	\$0.000000
63	Sandia pre-payment for T&M OS dev	9/1/2003	\$1.250000	9/8/2003	\$1.250000	-7	\$0.000000
64	PVFS or alternative demo file system	9/30/2003	\$0.250000	8/18/2004	\$0.250000	-323	\$0.000000
65	Functional MPI per requirements in SOW	9/30/2003	\$0.150000	9/30/2003	\$0.150000	0	\$0.000000
66	Fully functional TotalView on Starfish	9/30/2003	\$0.200000	8/18/2004	\$0.200000	-323	\$0.000000
67	General progress checkpoint	9/30/2003	\$0.300000	9/30/2003	\$0.300000	0	\$0.000000
68	Materials Purchase	10/1/2003	\$15.200000	9/23/2004	\$12.948710	-358	\$2.251290
69	RTAT parts back from FAB	10/15/2003	\$0.250000	2/20/2004	\$0.250000	-128	\$0.000000
70	Red/Black switch cabinet built	10/31/2003	\$0.200000	10/31/2003	\$0.200000	0	\$0.000000
71	Seastar I/O module board	10/31/2003	\$0.250000	3/2/2004	\$0.250000	-123	\$0.000000
72	General progress report	10/31/2003	\$0.200000	10/31/2003	\$0.200000	0	\$0.000000
73	Computer cabinet fabricated	11/30/2003	\$0.200000	12/16/2003	\$0.200000	-16	\$0.000000
74	RTAT Seastar evaluation	11/30/2003	\$0.400000	5/4/2004	\$0.400000	-156	\$0.000000
75	Seastar NTAT wafers released	11/30/2003	\$0.100000	6/5/2004	\$0.100000	-188	\$0.000000
76	General progress checkpoint	11/30/2003	\$0.200000	11/30/2003	\$0.200000	0	\$0.000000
77	Linux & catamount boot on Seastar demo	12/31/2003	\$0.200000	12/31/2003	\$0.200000	0	\$0.000000
78	Production Bill of Materials complete	12/31/2003	\$0.300000	8/18/2004	\$0.300000	-231	\$0.000000
79	SeaStar NTAT parts back from FAB	12/31/2003	\$0.100000	8/12/2004	\$0.100000	-225	\$0.000000

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2.b Comparison of Plan vs. Actual Performance Table

Milestone Number	Description of Milestone	Planned		Actual		Variance	
		Completion Date (mm/dd/yyyy)	Total Cost(\$M)	Completion Date (mm/dd/yyyy)	Total Cost(\$M)	Schedule (# days)	Cost(\$M)
80	General progress report	12/31/2003	\$0.300000	12/31/2003	\$0.300000	0	\$0.000000
81	Checkout first Pilot Compute Cabinet	1/7/2004	\$0.100000	8/18/2004	\$0.100000	-224	\$0.000000
82	4 I/O Seastar modules release	1/23/2004	\$0.250000	8/12/2004	\$0.250000	-202	\$0.000000
83	8 Compute Seastar modules	1/23/2004	\$0.250000	8/12/2004	\$0.250000	-202	\$0.000000
84	System boot demo on NTAT Seastar	1/30/2004	\$0.100000	1/30/2004	\$0.100000	0	\$0.000000
85	Service Plan V1 Release	1/30/2004	\$0.100000	5/19/2004	\$0.100000	-110	\$0.000000
86	General progress checkpoint	1/31/2004	\$0.100000	1/31/2004	\$0.100000	0	\$0.000000
87	Agency Compliance Testing	2/18/2004	\$0.200000	2/18/2004	\$0.200000	0	\$0.000000
88	Phase I Reliability & Stress System	2/27/2004	\$0.200000	2/27/2004	\$0.200000	0	\$0.000000
89	Production 12 Red/Black switch racks RTM	2/27/2004	\$0.250000	9/16/2004	\$0.250000	-202	\$0.000000
90	General progress checkpoint	2/29/2004	\$0.250000	2/29/2004	\$0.250000	0	\$0.000000
91	Phase III Stress System complete	3/24/2004	\$0.300000	3/24/2004	\$0.300000	0	\$0.000000
92	Phase II Reliability & Stress System complete	3/31/2004	\$0.300000	3/31/2004	\$0.300000	0	\$0.000000
93	General progress checkpoint	3/31/2004	\$0.300000	3/31/2004	\$0.300000	0	\$0.000000
94	Pass Phase IV Reliability & Stress test	4/15/2004	\$0.300000	4/15/2004	\$0.300000	0	\$0.000000
95	Factory demo of MP-Linpack at 3.5TFlops	4/30/2004	\$0.300000	4/30/2004	\$0.300000	0	\$0.000000
96	Red Storm online with Cray Service System	4/30/2004	\$0.200000	12/21/2004	\$0.200000	-235	\$0.000000
97	General progress checkpoint	4/30/2004	\$0.100000	4/30/2004	\$0.100000	0	\$0.000000
98	Demo 2US ping-pong MPI latency	5/1/2004	\$0.200000	5/1/2004	\$0.200000	0	\$0.000000
99	1/4 system-Single Service Partition	5/3/2004	\$0.400000	5/3/2004	\$0.400000	0	\$0.000000
100	General progress checkpoint	5/31/2004	\$0.300000	5/31/2004	\$0.300000	0	\$0.000000
101	1/4 System-Single Compute Partition	6/1/2004	\$0.400000	6/1/2004	\$0.400000	0	\$0.000000
102	Run MP-Linpack at 3.5 TFlops	6/30/2004	\$0.300000	6/30/2004	\$0.300000	0	\$0.000000
103	General progress checkpoint	6/30/2004	\$0.200000	6/30/2004	\$0.200000	0	\$0.000000

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2.b Comparison of Plan vs. Actual Performance Table

Milestone Number	Description of Milestone	Planned		Actual		Variance	
		Completion Date (mm/dd/yyyy)	Total Cost(\$M)	Completion Date (mm/dd/yyyy)	Total Cost(\$M)	Schedule (# days)	Cost(\$M)
104	1/4 system-Single Compute Partition	7/1/2004	\$0.400000	7/1/2004	\$0.400000	0	\$0.000000
105	Run MP-Linpack at 7 TFlops	7/31/2004	\$0.200000	7/31/2004	\$0.200000	0	\$0.000000
106	General progress checkpoint	7/30/2004	\$0.300000	7/30/2004	\$0.300000	0	\$0.000000
107	1/4 system-Final Service Partition	8/2/2004	\$0.400000	8/2/2004	\$0.400000	0	\$0.000000
108	Run MP-Linpack at 10.5 TFlops	8/31/2004	\$0.200000	8/31/2004	\$0.200000	0	\$0.000000
109	Demo bandwith, latency & BER	8/24/2004	\$0.200000	8/24/2004	\$0.200000	0	\$0.000000
110	Software reliability run (24 hrs)	8/24/2004	\$0.100000	8/24/2004	\$0.100000	0	\$0.000000
111	General progress checkpoint	9/30/2004	\$0.900000	9/30/2004	\$0.900000	0	\$0.000000
112	Material Purchase	10/1/2004	\$9.500000	6/28/2005	\$8.132514	-270	\$1.367486
112	Run MP-Linpack at 14 TerOPS	10/1/2004	\$2.000000	10/1/2004	\$2.000000	0	\$0.000000
113	Service payment 5/31/04-5/31/05	10/31/2004	\$2.500000	10/31/2004	\$2.500000	0	\$0.000000
115	Single 50 ASCI hour run	10/29/2004	\$4.000000	10/29/2004	\$4.000000	0	\$0.000000
116	Demo a factor of 7 performance increase	12/31/2004	\$3.000000	12/31/2004	\$3.000000	0	\$0.000000
117	All other SOW & Sched B requirements have been meet	12/31/2004	\$1.000000	12/31/2004	\$1.000000	0	\$0.000000
118	I/O meets SOW requirements of 50 GBbytes/sec demo	12/31/2005	\$1.000000	12/31/2005	\$1.000000	0	\$0.000000
118	Service Payment	10/31/2005	\$2.500000	10/31/2005	\$2.500000	0	\$0.000000
119	Service Payment	5/31/2006	\$2.500000	5/31/2006	\$2.500000	0	\$0.000000
119	service payment	9/30/2007	\$2.213174	9/30/2007	\$3.183974	0	-\$0.970800
119	Svc. Payment	5/31/2006	\$2.500000	5/31/2006	\$2.500000	0	\$0.000000
120	Additional funding for Red Storm upgrade	9/30/2008	\$7.996240	9/30/2008	\$7.996240	0	\$0.000000
120	Svc payment (10/16/07 - 10/15/08)	10/15/2008	\$2.500000	10/15/2008	\$2.500000	0	\$0.000000
121	Svc payment (10/16/08 - 10/15/09)	10/15/2009	\$2.500000		\$1.050000		\$1.450000
122	Svc payment (10/16/09 - 10/15/10)	10/15/2010	\$2.500000				
123	Gov't. FTE by FY 2006 and Earlier	9/29/2006	\$0.090000	9/29/2006	\$0.090000	0	\$0.000000

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2.b Comparison of Plan vs. Actual Performance Table

Milestone Number	Description of Milestone	Planned		Actual		Variance	
		Completion Date (mm/dd/yyyy)	Total Cost(\$M)	Completion Date (mm/dd/yyyy)	Total Cost(\$M)	Schedule (# days)	Cost(\$M)
124	Gov't. FTE by FY 2007	9/30/2007	\$0.030000	9/30/2007	\$0.030000	0	\$0.000000
125	Gov't. FTE by FY 200	9/30/2008	\$0.040000	9/30/2008	\$0.040000	0	\$0.000000
126	Gov't. FTE by FY 2009	9/30/2009	\$0.040000		\$0.016800		\$0.023200
127	Gov't. FTE by FY 2010	9/30/2010	\$0.050000				
Project Totals		10/15/2010	\$100.959414	10/15/2008	\$93.222723	730	\$7.736691